

My Lady's a Catayan, we are politicians, Malvolio's a Peg-a-Ramsey, and Three merry men be we. Am not I consanguineous? Am I not of her blood: tilly vally. Lady, There dwelt a man in Babylon, Lady, Lady.

— (F) *Twelfth Night*: II 3

WHEREFORE ART THOU, SHAKESPEARE'S SONGS?

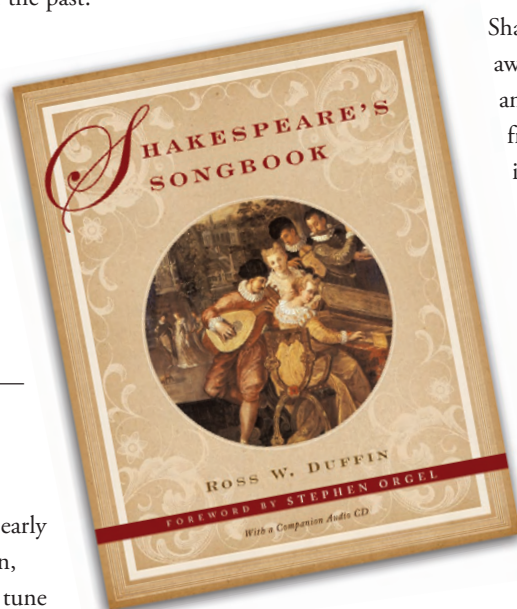
Growing up just forty miles outside Stratford, Ontario, Ross W. Duffin attended “just about everything the Stratford Festival produced,” referring to Canada’s classical repertory theatre festival devoted to the works of Shakespeare, Molière, and other great dramatists of the past.

“During that time, I was also becoming interested in early music, having been introduced to it, and to Shakespeare as well, by my mother,” says Duffin, the Fynette H. Kulas Professor of Music at the Case College of Arts and Sciences.

That may explain why Duffin feels so at home with William Shakespeare—and so driven to enrich the modern experience of his works by restoring the musical messages within them. His dual interests in Shakespeare and early music fermented for many years. Then, in 1993, Shakespeare’s use of a ballad tune title, “Roger” in *Winter’s Tale*, rekindled his interest and set him on an eleven-year mission that resulted in *Shakespeare’s Songbook* (W. W. Norton & Company, Inc.). The meticulously researched text with accompanying audio CD consolidates in a single resource more than 160 songs that appear in, are quoted in, or are alluded to in Shakespeare’s plays.

Duffin’s aim was to find the complete lyrics to the ballads, drinking songs, love songs, and rounds found in Shakespeare’s

works. “First, of course, I had to try to figure out which lines were actually song lyrics, and that took a lot of detective work.” He conducted much of his sleuthing at the Folger Shakespeare Library in Washington, D.C.



Shakespeare, he concludes, was “supremely aware” of the potential effects of music, and often inserted popular songs or lines from songs into his dialogue. But if you’re imaging Romeo belting out a ballad, don’t. According to Duffin, Shakespeare tended not to have his lead characters do the singing; instead, servants or others in the scene performed the songs. And the closest thing you may find to a Shakespearian “soundtrack album” is the CD included with *Shakespeare’s Songbook*, which features performances by leading early-music singers and instrumentalists.

What’s next for the early music expert? Elizabethan stage jigs. “These were farcical, song-and-dance playlets that were performed at intermission and after the serious plays at the Globe, the Rose, and so on, and they became enormously popular,” he says. “About two dozen of them survive, but most of the music is lost. At least, we *think* it’s lost...”

NANCY O’CONNOR

Nancy O’Connor is a Cleveland-area writer.

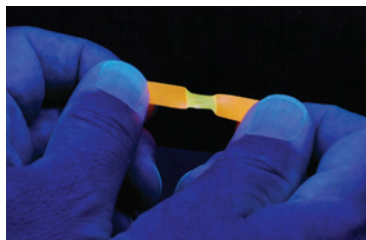
"We're at a level of sophistication that would allow us to produce a simple product now." — Christoph Weder

POLYMER BREAKTHROUGHS SIGNAL PRODUCT BREAKDOWNS

Would you want the T-bone in the meat case to speak up if it was less than fresh? Or the carton of milk to shout, "Sorry, no can do. I'm sour!" if it was?

Thanks to the efforts of Christoph Weder, associate professor in Case's Department of Macromolecular Science and Engineering and his engineering team, product labels made of polymer materials with built-in sensors may one day help food retailers and customers better gauge product freshness and safety. Of course, the meat and milk wouldn't really communicate with you, but their labels and temperature tags would.

"Threshold temperature tags, which would irreversibly change color if food or drugs were stored above a tolerable temperature, would help consumers and retailers identify spoiled products," explains Weder. "For instance, if brought to market today, these would allow a store owner to use a hand-held black light to check for borderline or spoiled products. If the package's tag was fluorescing green, for instance, it would mean 'leave on shelf'; orange, 'hurry and sell it'; red, 'take it out.'"



Tomorrow's polymer packaging could also incorporate "stimuli-responsive" dyes that would signal if a food container or medicine bottle had been tampered with. "We're at a level of sophistication that would allow us to produce a simple product now," he says, citing tamper-evident packaging tape as an example.

Weder's group has been working on materials with built-in temperature and deformation

sensors for nearly three years. Their latest findings were recently reported in the summer 2005 issue of *Advanced Materials* journal. The goal now, says Weder, "is to develop materials that would not require a black light, but produce color changes that can be seen with the naked eye."

He first stumbled into deformation sensor technology while working in his homeland of Switzerland on anti-counterfeiting technologies. He joined the Case faculty in 2001, because, "Case is a great place to be if you do polymer science. We have the sixth-best polymer science department in the country, according to *U.S. News and World Report*. If you study polymers, this is the hot spot!"

NANCY O'CONNOR

Polyethylene film incorporating fluorescent dyes that function as molecular deformation sensors. The middle portion of the film was stretched.

